Process history for 2007-08

2007-08, the 4th year of LITRE operation, was a year focusing on implementation and data collection, mainly in the three large-scale LITRE projects. These three projects, chosen during the summer of 2007, are:

- Thoroughly Modern MILLIE (Methods of Incorporating the Latest Learning Innovations in Education). PI: Dr. Robert Beichner.
- Computer Based Modeling for Engineering. PIs: Amy Craig, Jan Genzer, Jeff Joines, Dianne Raubenheimer and Stephen Roberts.

In 2007-08, LITRE continued to be led by the LITRE Executive Council consisting of Tom Miller, Vice Provost of DELTA; Karen Helm, Director of University Planning & Analysis; Hugh Devine, professor in Parks Recreation and Tourism Management and until December 2007, Barbi Honeycutt, Interim Director, FCTL. Geetanjali Soni, Coordinator of LITRE Assessment, continued to coordinate and provide assessment assistance to the LITRE projects. The LITRE Assessment Committee and the LITRE Advisory Board continued to function in advisory roles.

LITRE activities in this last year are summarized below:

- The LITRE Advisory Board (LAB) met periodically with Dr. Devine as chair, to discuss LITRE related issues. This board, made up of faculty and staff from each of the Colleges and major administrative units, provided advice and guidance to the LITRE Executive Council. Members also served as a campus forum for issues related to student learning and technology and as liaisons to their college or unit for LITRE-related matters.
- Dr. Soni, LITRE assessment coordinator, worked with the PIs of the three large projects to establish assessment plans and develop or choose assessment tools and instruments. Project assessment plans, measurement instruments and timelines were developed.
- PIs of the large projects met periodically (and will continue to meet) to discuss progress on projects and assessment of student learning. A Vista website is being maintained to encourage communication and collaboration.
- The student learning toolkit was redesigned and launched on the LITRE website.
- Based on conversations with various partners of LITRE, it was decided to hold a LITRE Learning Expo in spring of 2009, highlighting teaching and learning with technology initiatives on NC state campus, and as a closure on Phase 2 of the LITRE project.
- Work commenced on revising and updating the 2003 LITRE Faculty survey which will be administered to all NC State Faculty in fall 2008.
- Several presentations on the LITRE projects were made at local as well as out of state conferences and meetings by faculty PIs and LITRE administrators.
Progress report from LITRE Projects
The three large LITRE projects submitted their first progress reports. These projects are at present in different stages of implementation. A brief summary of the current status and available results of each project is provided below.

**Computer Based Modeling for Engineering (COE)**
The COE project focuses on development of curricula to teach students to model problems, solve these problems using modeling tools, and then to analyze the solutions through decision support (i.e., become “power users” not programmers). A series of “in-class labs” integrate the traditional lab and lecture sessions into one, and in-class activities are completed on student-owned laptops. The instructors use tablet PCs to facilitate and guide student learning as they work on problems in class.

This LITRE COE project grew out of a course using Excel and VBA first designed and taught in the departments of Industrial and Systems Engineering (ISE) and Textile Engineering (TE) in 2006. The course concept is now being expanded to other Engineering departments as well as upper level courses.

To date, data in this project have been collected for the fall 2006, spring 2007, fall 2007 and spring 2008 semesters. Data collection will continue until the end of the spring 2009 semester. The following milestones have been achieved:
- The project has been expanded to two new departments (Civil, Construction and Environmental Engineering (CCEE) and Biological and Agricultural Engineering (BAE))
- The creation of a Computing Thread in three departments, Industrial and Systems Engineering (ISE), Textile Engineering (TE) and Chemical and Biomolecular Engineering (CBE) has been completed.
- A repository of problem solving tasks in CBE has been created.
- A student workbook for ISE & TE 110 was developed.
- Progress has been made towards developing an Excel/VBA manual for ISE & TE.
- 9 conference presentations have been made on this project.
- An Excel faculty development workshop and materials were developed.
- Preliminary data analysis was started.

**Summary of findings to date**
**Student confidence levels using Excel and VBA.**
- At the end of the introductory courses in all departments surveyed, students are ‘confident’ to ‘highly confident’ in using all of the Excel features taught in the courses and this is also reflected in their in-class assignment grades.
- Students were also ‘confident’ to ‘highly confident’ in using most of the VBA features taught.
- Students in a 400-level ISE course were surveyed using the same set of questions about Excel and VBA. The results show that student who had taken the introductory course were significantly more confident on most of the dimensions than the students who had not taken the class.
Student views about learning

- The hands-on nature of the TE 110 class involving the use of laptops was cited most frequently as being the greatest benefit for student learning.
- Students also appreciated being able to work examples in class.
- They also felt that practice and repetition were important to their learning, and stated that the homework assignments were very beneficial to apply skills and concepts learned in class.

Student views about the introductory courses

- Survey data showed a) preference for integrated lab and lecture so that students can practice what is learned at the same time, (b) having the instructor demonstrate by using a computer, and (c) a preference for small class size.

Attitudes to learning in introductory courses

- A survey focusing on attitude to learning and learning styles is being administered.
- Student final grades were positively correlated to ratings given to two items on this survey, namely (a) regularity of class attendance, and (b) sticking with a solving a problem when it cannot be solved immediately.

Problem solving task

A problem solving task that involved modeling and making a decision about a job offer scenario was developed for implementation in the TE and ISE 110 class, and in selected upper division classes (400 level) for each of those departments. Students were required to complete this task and they also completed an in-class online reflection about their problem solving process.

Early results suggest that students who used technology to solve the problem were more successful in providing an advanced solution to the problem, incorporating probability by performing a simulation, examining various scenarios in order to generate a solution and make a recommendation accordingly.

VOLT: Virtual Online Learning and Teaching

VOLT looks at the educational use of video games and virtual worlds among undergraduate students in Science Education, and graduate students in Science Education, Adult and Higher Education, and Business Management. The project examines the effect of games and virtual worlds on student learning, student attitudes and perceptions, online presence, group dynamics and social capital and communities of practice.

The following milestones have been achieved:

- Len Annetta and his graduate student developed two games or case studies to be used in PI Storbek-Walker and Chapman’s classes respectively.
- Drs. Aimen-Smith and Kimbrough began implementation in SecondLife and a data collection plan was developed.
- So far, data has been collected in fall 2007 and spring 2008. Preliminary data analysis has begun.
- Fall 2007 piloted the games in four classes and data was collected on student learning, affect, and social networking as it related to online presence.
- In November 2007, project PIs met again to plan for the spring 2008 semester and discuss current and future data collection.
• In Spring 2007:
  o Dr. Storberg-Walker reused her game with attention to student feedback provided during the fall semester.
  o Dr. Chapman taught a research class in the spring and had her students meet Dr. Kimbrough’s students in SecondLife to evaluate the work developed by Kimbrough’s students.
  o Dr. Annetta taught a doctoral level class online and decided to teach half of the semester using Activeworlds and the other half using Elluminate to ascertain student feedback to using two distinctly different delivery platforms for online learning.
  o A graduate student in Management was hired and rich data was collected in all four classes taught in three program areas.

Summary of findings to date
Quantitative analysis is underway but not complete. Early qualitative results show that:
• It is possible to bring large numbers of students into a virtual environment. BUS 465, for example, included a total of 150 students over 2 semesters and all students were able to get into Second Life.
• Access to appropriate hardware is the most significant constraint to successful use of virtual worlds in these classes.
• Student projects in BUS 465 demonstrated that most team members understood the potential for this new technology for virtual collaboration and as a possible marketing communications tool.
• Results from BUS 465 also showed that attitudes about, and acceptance of, virtual worlds for use in collaboration and marketing varied much as acceptance of any new product varies. There were “innovators” and “early adopters” who took to it well and went beyond expectations and there were “late adopters” and “laggards” who did not want to use the technology and were dragged into it with a high level of skepticism.
• In a qualitative study in EMS 731, PI Annetta discovered that multiplatform delivery shed light on future directions of online learning. Using Elluminate and Activeworlds throughout the semester, students reported a preference for Activeworlds due to its immersive nature.

MILLIE: Methods of Incorporating the Latest Learning Innovations in Education
Thoroughly Modern MILLIE uses new technologies to update the traditional lecture/lab-based course. It further adapts an existing course that has already been the subject of considerable reform in the very successful SCALE-UP project. (http://www.ncsu.edu/PER/scaleup.html). In MILLIE, video or podcasts provide course materials. Embedded questions provide feedback, and faculty freed from 3 hours of lecturing hold 3 one-hour seminars with smaller groups.

Dr. Beichner plans to complete the PY205 videos this summer, test them with a regular class in the fall, and then use them as planned during the spring semester. There will be data from the fall and spring semesters to permit analysis by February 2009.

During the fall semester, a pilot implementation will provide the videos as optional materials for a regular lecture section. These students will be interviewed and surveyed for their thoughts
about the new materials, how they utilized them, and how they might be improved. This information will be used to modify the videos, if necessary, for use in a full-scale trial in the spring. In spring 2009 a section of PY205 will be divided into a treatment and control group. The treatment group will not attend the lecture, but will watch the videos and attend a seminar instead. Surveys and interview questions that have been previously developed for the project will be utilized to assess attitude and reading method changes. Content learning will be assessed by comparison of exam scores to students in other sections of the course.

Other LITRE Projects
Student opinions on technology and learning continue to be collected using the Graduating Senior and Sophomore surveys. Survey data analysis will be completed in this coming semester for each of these surveys.

Alumni and faculty surveys have also been developed and will be administered in the 2008-09 academic year.

LITRE Like Projects:
Large Course Redesign
Large Course Redesign is the re-conceiving and rebuilding of courses, that are among the top 25 in enrollment, and/or the top five percent in enrollment in a college, to increase student learning and to contain or reduce instructional costs, primarily by incorporating instructional technology.

DELTA staff spent over 700 hours dedicated to the LCR program, including the needed program planning, administrative and research activities to get this program started this year, as well as in working with the individual projects. The staff focused on better understanding LCR concepts this year, via research, project planning, and faculty and staff training (workshops and seminars) in the FY 2008. This also included establishing the DELTA Large Course Redesign (LCR) Pilot Grant Program—a criteria-based proposal process to support the redesign of large enrollment and critical path courses at the university.

DELTA has been working with faculty and staff on initial redesign planning and implementation for several "high needs" courses at NCSU. During the FY 2007, DELTA (in conjunction with the Registrar’s office) identified four courses to receive DELTA LCR seed grant funding in support of course redesign planning: Chemistry 101, Mechanical and Aerospace Engineering 206 and 208, and Physics 205.

Other projects
Information has been formally requested from the LITRE advisory board members about LITRE-like projects in their colleges and these will be included in the LITRE final report. The final report will also include updates on the LITRE like projects included in earlier annual reports.

LITRE Executive Council Recommendations
- The LITRE faculty advisory board recommended that LITRE functions be continued beyond the 2009 SACS report, and the LITRE Executive Council endorsed that recommendation. The council recommends continuing LITRE, perhaps in an adapted
form, to support faculty doing educational research in their discipline. This includes help to: disseminate the results of that research in professional venues that can be rewarded, facilitate access to literature on best practices, and encourage faculty communities of learning around various uses of technology for improving teaching and learning. By assisting faculty with educational research design and implementation, LITRE can help promote the scholarship of teaching and learning (SOTL).

- The LEC recommends supporting the faculty large grant program in any future form of LITRE. These grants have provided a close look at selected projects in which one or more faculty members adapt their pedagogy in a particular course to include a particular technology and then assess the impact on student learning. Successful project results can be modified or scaled-up across the University.

- A LITRE learning Expo will be held in January 2009 to highlight LITRE projects and share findings with the NC State University community. The Expo will feature multiple exhibits and demonstrations by NC State faculty and students as well as technology workshops and a series of presentations by LITRE project principle investigators.